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AMSAT NEWS SERVICE
ANS-078
The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT North America, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to:
ans-editor at amsat.org.

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SB SAT @ AMSAT $ANS-078.01
ANS-078 AMSAT News Service Weekly Bulletins

AMSAT News Service Bulletin 078.01
 >From AMSAT HQ KENSINGTON, MD.
DATE March 19, 2017
To All RADIO AMATEURS
BID: $ANS-078.01

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## AMSAT Ground Terminal Weekly Report for March 7, 2017

We kick off this week’s report with two demonstrations of DVB-S2 transmission from the LimeSDR. The first from Charles Brain G4GUO, and the second from Paul KB5MU and Michelle W5NYV. Charles has live video and Paul and Michelle are transmitting a pre-recorded work of art called Adventure Time.

Mike Seguin N1JEZ has some LimeSDR spectral analysis to report.
https://www.youtube.com/watch?v=_ZNshry3sZU
First, 850 MHz Phase Noise 10 kHz offset 1 kHz resolution bandwidth
-58.36 – 10LOGBW = -88.36 dBc/Hz
If I read the LMS7002M Spec sheet right, it should be down around -96 dBc/Hz? PDF is in the Phase 4 Ground Github link is in the show notes.

https://github.com/…/d…/tree/master/Engineering/SDRs/LimeSDR
Second, 2850 MHz Phase Noise 10 kHz offset 1 kHz resolution bandwidth
-49 – 10LOGBW = -79 dBc/Hz spec around -87 dBc/Hz?
Third image is at 2850 MHz ±200 kHz
Check out those curious 200 kHz spurs
Fourth image is 2850 MHz 100 MHz Span
A broader view – we need to go digging deeper.
Final image is 2850 MHz 388 kHz spur
small spur on the low side?
Output power varies. He's seen upwards of +15 dBm. He is powering the LimeSDR board off an external supply.
He is using LimeSuite to set up the transmit output on TX1-1. There are so many settings it's possible/probable we're missing something.

He has also have done rudimentary noise figure measurements. Paul, W1GHZ loaned him a homebrew noise head he had built from his QEX article in 1996? on Noise Figure. He used it to measure the NF, but had to rely on a chart for ENR. So assumptions!!! He found he definitely had to use a preamp in front of the Lime. He used an AD6IW wideband pre for testing.

"I need to do more real world tests on the bands…." -Mike Seguin

In the next segment of this report Paul described how to use the examples folder in GNU Radio to get to the DVB flowgraphs we've been using for experiments.

Charles G4GUO shares his plan for next steps for DVB-S2 receive. He is looking at how to do the front end that finds the start of a frame and compensates for frequency error. He is pondering how to do this and has some ideas. He also has the low density parity check (LDPC) decoder to do but has not yet planned it out. He has the BCH decoder done and the bit that decodes the preamble code FEC.

Charles explains that the whole of DVB-S2 has been designed for the parallel processing powers of ASICs/FPGAs/GPUs. He has decided to attack the problem using GPUs.

He asserts that GPUs don't have such a steep learning curve as some of the other technologies. He believes that the symbol tracking and root raised cosine filtering is best done in the FPGA on the LimeSDR. His thoughts are to re-write some of the Lime code so he can alter the ADC sample rate in fractions of a symbol. Then use the host to calculate the timing error and send the correction to the Lime FPGA code. The Lime can also do fine frequency error correction using a complex mixer. The error can be calculated in the host from the phase change in the preamble sequence.

The central question is how to fit it into the memory model of the GPU to keep all the threads fully occupied. This means properly balancing the combination of LDPC decoding, parallel thinking and NVIDIA GPU programming. One of the many questions he has is how to cope with the final XOR of the parity bit for each block as that makes every bit in the whole thing dependent on every other bit. He believes that there must be a short cut so you can break the problem at the receiver down into a load of independent blocks (divide and conquer).

It is all very DVBS2 specific but when a sub block of the code meets a condition where all its parity check equation are correct it can be marked as finished and the decoder can then move on to the next sub block. It requires a lot of thinking about and Charles welcomes your feedback.

So! Lots of programming! We are here to help with this effort! It's

going to be a big one.

Please join AMSAT, TAPR, ARRL, and any other local or regional club that is helping advance the state of the art in amateur radio. Projects like ours cannot exist without your membership.

http://www.amsat.org/?p=5875

[ANS thanks Michelle Thompson, W5NYV and the AMSAT Ground Terminal Team for the above information]

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AMSAT SA to Sponsor SDR Workshop in Cape Town

SDR workshop in Cape Town on 22 April. Following on a very successful symposium on Software Defined Radio held in Gauteng towards the end of last year, a similar event will be presented by AMSAT SA in the Cape on Saturday 22 April 2017 at the Bellville Campus of the Cape Peninsula University of Technology. To register visit http://www.amsatsa.org.za/

[ANS thanks the South African Radio League News for the above information]

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CAS-4A and CAS-4B Linear Transponder Frequencies Announced

CAMSAT has worked closely with a Beijing Government aerospace contractor to build two satellites with amateur radio linear transponder payloads. IARU record a launch had been planned for March 31, 2017 from Taiyuan into a 524 km orbit with an inclination of 42 degrees.

Both will carry a 435/145 (U/V) 20 dBm (100 milliwatt) SSB/CW linear transponder, a 2m CW 17 dBm (50 mW) telemetry beacon and an AX.25 4.8 kbps GMSK 20 dBm (100 mW) telemetry downlink.

The two micro-satellites will also carry optical remote sensing missions. Planned to be 494x499x630 mm dimension regular square shape and approximately 50 kg mass with three-axis stabilization system.

These frequencies have been coordinated by the IARU Satellite Frequency Coordination Panel:

CAS-4A
• Linear transponder downlink 145.870 MHz, emission designator 20K0V8WWF, output power 20 dBm
• Linear transponder uplink 435.220 MHz
• CW telemetry beacon 145.855 MHz, emission designator 100HA1AAN, output power 17 dBm
• GMSK telemetry 145.835 MHz, emission designator 16K0F1DCN, output power 20 dBm

CAS-4B
• Linear transponder downlink 145.925 MHz, emission designator 20K0V8WWF, output power 20 dBm

• Linear transponder uplink 435.280 MHz
• CW telemetry beacon 145.910 MHz, emission designator 100HA1AAN, output power 17 dBm
• GMSK telemetry 145.890 MHz, emission designator 16K0F1DCN, output power 20 dBm

[ANS thanks AMSAT-UK and Trevor, M5AKA for the above information]

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IARU Page Shows Proposed South Korean Satellite K2SAT

The Republic of Korea Air Force Academy has applied to the IARU for coordination of its' K2SAT satellite frequencies.

Headline Details:
A 3U CubeSat. The missions of the K2SAT are to demonstrate satellite imaging and transfer, and secondly to test voice repeating capability.

The payloads:
1. On-board camera 2. On-board voice repeater. Attitude control will be performed with 3-axis reaction wheels and magnetorquer. The satellite surface that contains the main payload(Camera) shall be aligned to the nadir direction of the satellite. Requesting coordination for a V/U transponder. The TX would also be capable of downlinking AX25 telemetry at 9k6 using BPSK. Planning a 2018 launch into a 500 or 600km SSO.

[ANS thanks the IARU Page for the above information]

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ARISS Closer to Launching New Radio System

March 13, 2017:  The ARISS team took a giant step closer to flying the new ARISS Interoperable Radio System to the International Space Station, having met a major milestone.  Lou McFadin, W5DID, and Kerry Banke, N6IZW, travelled to the NASA Johnson Space Center (JSC) in Houston, Texas, in mid-February for preliminary testing of Banke's breadboard version of the ARISS Multi-voltage Power Supply. The two worked alongside JSC engineers and JSC EMC lab personnel, putting the specially built power supply through its paces, checking against US and Russian space specifications for Power Quality and Electromagnetic Compatibility (EMC) preliminary tests.

The result:  Outstanding news-the ARISS Team can move on to the next step, fabrication of prototype and flight units.  The JSC engineers disclosed that the ARISS breadboard power supply was the first hardware to have passed all of the space agencies' tests! They said the very professional ARISS Team certainly knew hardware development and design.

ARISS-International Chair Frank Bauer thanked Banke and McFadin for the multiple days spent putting the unit through the serious battery of NASA and Russian preliminary electrical tests.  Banke expressed pleasure with the results: "I was looking to come away with what we needed to move forward. We achieved that."  He was impressed with the support he and McFadin received from the testing group, and said key players on those

teams who are also ham radio operators, commented that they find equipment brought in that is supported by ham radio operators, to earn particularly good marks. McFadin asserted that the Multi-voltage Power Supply's fine test results are due to ARISS's team working very well together and being very experienced.

The completed testing of the breadboard unit means McFadin can now purchase expensive space-certified parts so the final prototype/flight power supplies can be fabricated. He and Banke now know that when the final, even more rigorous tests are done, the units will pass with flying colors.

Watch for more news stories on the hardware and the fundraising campaign to help support the costs associated with designing, building, and testing the new ARISS radio system-the Kenwood D710GA and Multi-voltage Power Supply. Those wishing to contribute toward the final fabrication and flight tests are highly appreciated and asked to go to the AMSAT website, www.amsat.org, to click on the "ARISS Donate" button. Or visit the donation page on the ARISS website, http://www.ariss.org/donate.html. Contributions are tax deductible. Those who contribute $100 or more will receive the handsome ARISS Challenge Coin. If you or your ham club or place of employment wish to make a highly substantial contribution, contact Frank Bauer, KA3HDO, at ka3hdo(a)verizon.net.

About ARISS

Amateur Radio on the International Space Station (ARISS) is a cooperative venture of international amateur radio societies and the space agencies that support the International Space Station (ISS). In the United States, sponsors are the Radio Amateur Satellite Corporation (AMSAT), the American Radio Relay League (ARRL), the Center for the Advancement of Science in Space (CASIS) and National Aeronautics and Space Administration (NASA). The primary goal of ARISS is to promote exploration of science, technology, engineering, and mathematics (STEM) topics by organizing scheduled contacts via amateur radio between crew members aboard the ISS and students in classrooms or informal education venues. With the help of experienced amateur radio volunteers, ISS crews speak directly with large audiences in a variety of public forums. Before and during these radio contacts, students, teachers, parents, and communities learn about space, space technologies, and amateur radio. For more information, see www.ariss.org, www.amsat.org, and www.arrl.org.

Also, join us on Facebook: Amateur Radio on the International Space Station (ARISS) / Follow us on Twitter: ARISS_status

[ANS thanks David Jordan, AA4KN for the above information]

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AMSAT Awards Update

This is the first posting of awards for 2017. The year started slow and then picked up with the following earning their awards.

AMSAT Satellite Communicators Award for making their first satellite QSO
Christopher Hobbs, KD5RYO
Frank Garofalo, WA2NDV

Milan Stancel, OM4MX

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AMSAT Communications Achievement Award
Adrian Liggins, VA3NNA, #575
Matthew Stevens, KK4FEM, #576
Milan Stancel, OM4MX, #577

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AMSAT Sexagesimal Award
Ronald Parsons, W5RKN, #178
Matthew Stevens, KK4FEM, #179

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AMSAT Century Club Award
Frank Westphal, K6FW, #49
Toralf Renkwitz, DJ7MS, #50
Ronald Oldham, N8RO, #51

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South Africa Satellite Communications Achievement Award
Adrian Liggins, VA3NNA, #US202
Matthew Stevens, KK4FEM, #US203
Milan Stancel, OM4MX, #US204

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AMSAT Robert W. Barbee Jr., W4AMI Award
Cleber Rodrigues, PY3TX, #88
Paul Stoezter, N8HM, Upgrade to 4000
Frank Westphal, K6FW, Upgrade to 2000
John Papay, K8YSE/7, Upgrade to 3000

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AMSAT Robert W. Barbee Jr., W4AMI Award
Ronald Parsons, W5RKN, #89
Milan Stancel, OM4MX, #90

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To see all the awards visit http://www.amsat.org or
http://www.amsatnet.com/awards.html

[ANS thanks Bruce Paige, KK5DO, AMSAT Director Contests and Awards
for the above information]

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6E3MAYA on Satellites March 18-21

Mexico trip includes satellite operating plans:

XE, Mexico:
A group of Mexican amateurs plans to visit archaeological sites of Maya culture in Yucatan, Campeche, Tabasco, Chiapas, and Quintana Roo from the 18th to 21st. QRV with the call 6E3MAYA on 80-6m on SSB, CW, digital modes and via satellites. QSL via XE3N, LoTW.

[ANS thanks the DARC DX Newsletter DXNL 2032 March 15, 2017 for the above information]

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AMSAT Events

Information about AMSAT activities at other important events around the country. Examples of these events are radio club meetings where AMSAT Area Coordinators give presentations, demonstrations of working amateur satellites, and hamfests with an AMSAT presence (a table with AMSAT literature and merchandise, sometimes also with presentations, forums, and/or demonstrations).

*Friday through Sunday, 31 March–2 April 2017, NVCON in Las Vegas NV

*Wednesday, 5 April 2007 – presentation for Scottsdale Amateur Radio Club in Scottsdale AZ

*Friday and Saturday, 7-8 April 2017, Green Country Hamfest in Claremore OK

*Saturday, 6 May 2017 – Cochise Amateur Radio Association hamfest in Sierra Vista AZ

*19-21 May 2017, HamVention in the Greene County Fairgrounds and Expo Center, Dayton, Ohio

*Friday and Saturday, 9-10 June 2017, HAM-COM in Irving TX

*Saturday, 10 June 2017 – Prescott Hamfest in Prescott AZ

[ANS thanks AMSAT-NA for the above information]

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ARISS News

Successful Contacts

* A direct contact with students at McBride High School, Long Beach, CA, USA was successful Wed 2017-03-15 16:28:44 UTC 25 deg. Astronaut Thomas Pesquet, KG5FYG answered all 19 questions prepared by students.

Upcoming Contacts

* A telebridge contact via W6SRJ with students at “School of Trois Paletuviers”, Saint-Georges de l'Oyapock, French Guyana, is presently scheduled Thu 2017-03-23 12:42:26 UTC 61 deg. with Astronaut Thomas Pesquet KG5FYG.

Trois Palétuviers is a small native people village of French Guyane, set between the Amazonian forest and the majestic Oyapock River, a natural border with Brazil. It is accessed only by dugout and the journey takes place in one hour. On site, no electricity during the day, internet and telephone recently, but a quality of life preserved, which in no way excludes projects and achievements in order to help envisage the future in a dynamic and optimistic way. The village comprises a population of 180 inhabitants, exclusively Native Americans and many of whom have strong ties with Brazil.

The school hosts about fifty students divided into 2 classes: a kindergarten from the PS to the GS, an elementary from the CP to the CM2. In addition to the usual teachings, the school offers activities that enable you to travel and make contact with the outside of the village. So :

The "chess game for academic success" has been helping since 2006 to reason and confidence in its abilities,
The theater club has already performed several times in French Guiana.
A highly eclectic choir gives everyone the opportunity to express themselves.

In addition, there are urban dance classes, numerous programs and projects related to the environment, space, health and so on.
Another peculiarity is that a school for parents has been in place since 2011.

For the liaison with the ISS, the pupils will travel 1 hour of canoe motor and 3 hours of road.

*  A direct contact via AA4UT with students at the Student Space Technology Association, Knoxville, TN, USA  will be rescheduled.

The University of Tennessee Knoxville is an amazing school located in the hills of Tennessee. It is the largest campus in the state, hosting more than 30,000 students. This school is known for its engineering and science heritage, having close ties with research facilities such as Oak Ridge National Lab and companies like Alcoa. Also, included in our alumni are 9 astronauts including the recent ISS inhabitant Scott Kelly. Our school is filled with thousands of eager students seeking to pursue careers in the space industry. With our vision of becoming a top-tier research school, our students are set to become the next leaders in STEM industries.

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ARISS  is always glad to receive listener reports for the above contacts. ARISS  thanks everyone in advance for their assistance. Feel free to send your  reports to aj9n(a)amsat.org or aj9n(a)aol.com.

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Message to US Educators
Amateur Radio on the International Space Station
Contact  Opportunity

Call for Proposals
Proposal Window February 15 –  April 15, 2017

The Amateur Radio on the International Space  Station (ARISS) Program is seeking formal and informal education institutions  and organizations, individually or working together, to host an Amateur Radio  contact with a crew member on board the ISS.  ARISS anticipates that the  contact

would be held between January 1, 2018 and June 30, 2018. Crew scheduling and ISS orbits will determine the exact contact dates. To maximize these radio contact opportunities, ARISS is ; looking for organizations that will draw large numbers of participants and integrate the contact into a well-developed education plan.

The deadline to submit a proposal is April 15, 2017. Proposal information and documents can be found at www.arrl.org/hosting-an-ariss-contact.

The Opportunity
Crew members aboard the International Space Station will participate in scheduled Amateur Radio contacts. These radio contacts are approximately 10 minutes in length and allow students to interact with the astronauts through a question-and-answer session.

An ARISS contact is a voice-only communication opportunity via Amateur Radio between astronauts and cosmonauts aboard the space station and classrooms and communities. ARISS contacts afford education audiences the opportunity to learn firsthand from astronauts what it is like to live and work in space and to learn about space research conducted on the ISS. Students also will have an opportunity to learn about satellite communication, wireless technology, and radio science. Because of the nature of human spaceflight and the complexity of scheduling activities aboard the ISS, organizations must demonstrate flexibility to accommodate changes in dates and times of the radio contact.

Amateur Radio organizations around the world, NASA, and space agencies in Russia, Canada, Japan and Europe sponsor this educational opportunity by providing the equipment and operational support to enable direct communication between crew on the ISS and students around the world via Amateur Radio.
In the US, the program is managed by AMSAT (Radio Amateur Satellite Corporation) and ARRL (American Radio Relay League) in partnership with NASA and CASIS (Center for the Advancement of Science in Space).

More Information
Interested parties can find more information about the program at www.ariss.org and www.arrl.org/ARISS.

For proposal information and more details such as expectations, proposal guidelines and proposal form, and dates and times of Information Sessions go to
http://www.arrl.org/hosting-an-ariss-contact.
Please direct any questions to
ariss(a)arrl.org.

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ARISS is always glad to receive listener reports for the above contacts. ARISS thanks everyone in advance for their assistance. Feel free to send your reports to aj9n(a)amsat.org or aj9n(a)aol.com.

Listen for the ISS on the downlink of 145.8Ø MHz.

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All ARISS contacts are made via the Kenwood radio unless otherwise noted.

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Several of you have sent me emails asking about the RAC ARISS website and not being able to get in. That has now been changed to

http://www.ariss.org/

Note that there are links to other ARISS  websites from this site.

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Looking  for something new to do?  How about receiving DATV from the  ISS?

If interested, then please go to the ARISS-EU website for complete
details.  Look for the buttons indicating Ham Video.

http://www.ariss-eu.org/

If you need some  assistance, ARISS mentor Kerry N6IZW, might be able to
provide some  insight.  Contact Kerry at
kbanke(a)sbcglobal.net
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ARISS  congratulations the following mentors who have now mentored over 100
schools:

Satoshi 7M3TJZ with 123
Gaston ON4WF with  123
Francesco IKØWGF with  119

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The  webpages listed below were all reviewed for accuracy.  Out of date
webpages were removed and new ones have been added.  If there are
additional ARISS websites I need to know about, please let me know.

Note, all times are approximate.  It is recommended that you  do your
own orbital prediction or start listening about 10 minutes before  the
listed time.
All dates and times listed follow International  Standard ISO 8601 date
and time format  YYYY-MM-DD HH:MM:SS

The complete schedule page has been updated as of 2017-03-09 05:00 UTC.
Here you will find a listing of all scheduled school contacts, and
questions, other ISS related websites, IRLP and Echolink websites, and
instructions for any contact that may be streamed live.

http://www.amsat.org/amsat/ariss/news/arissnews.rtf
http://www.amsat.org/amsat/ariss/news/arissnews.txt

Total  number of ARISS ISS to earth school events is 1116.
Each school counts  as 1 event.
Total number of ARISS ISS to earth school contacts is 1080.
Each contact may have multiple schools sharing the same time slot.
Total number of ARISS supported terrestrial contacts is 47.

A  complete year by year breakdown of the contacts may be found in the
file.
http://www.amsat.org/amsat/ariss/news/arissnews.rtf

Please  feel free to contact me if more detailed statistics are needed.

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The following US states and entities have never had an ARISS contact:
Arkansas, Delaware, South Dakota, Wyoming, American Samoa, Guam,
Northern Marianas Islands, and the Virgin Islands.

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QSL information may be found at:
http://www.ariss.org/qsl-cards.html

ISS callsigns: DPØISS, IRØISS, NA1SS, OR4ISS, RSØISS

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The successful school list has been updated as of 2017-02-23 05:00 UTC.

http://www.amsat.org/amsat/ariss/news/Successful_ARISS_schools.rtf

Frequency chart for packet, voice, and crossband repeater modes showing
Doppler correction as of 2005-07-29 04:00 UTC
http://www.amsat.org/amsat/ariss/news/ISS_frequencies_and_Doppler_correction.rtf

Listing of ARISS related magazine articles as of 2006-07-10 03:30 UTC.
http://www.amsat.org/amsat/ariss/news/ARISS_magazine_articles.rtf

Check out the Zoho reports of the ARISS contacts

https://reports.zoho.com/ZDBDataSheetView.cc?DBID=412218000000020415

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Exp. 49 on orbit
Shane Kimbrough KE5HOD
Andrei Borisenko
Sergey Ryzhikov

Exp. 50 on orbit
Peggy Whitson
Thomas Pesquet KG5FYG
Oleg Novitskiy

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Watch
http://www.ariss.org/upcoming-contacts.html
for information about upcoming contacts as they are scheduled.

[ANS thanks ARISS and Charlie, AJ9N for the above information]

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Satellite Shorts from All Over

Help Wanted - Russian Space Agency

If you know what this means, "Mukhnem na Lunu: Rossiya ishchet novykh kosmonavtov"*, you may be able to apply at Russia's space agency, who on Tuesday announced a recruitment drive for young would-be cosmonauts who it hopes will become the country's first on the Moon. And women are welcome, an official stressed.

In the first such drive for five years, Roscosmos space agency said it is looking for 6 to 8 cosmonauts who will operate a new-generation spaceship now in development and "will become the first Russians to fly to the Moon".

The full story is posted at:
http://www.spacedaily.com/reports/Fly_me_to_the_Moon_Russia_seeks_new_cosmonauts_999.html

*Translation: Fly me to the Moon: Russia seeks new cosmonauts

[ANS thanks SpaceDaily.com for the above information]

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In addition to regular membership, AMSAT offers membership in the President's Club. Members of the President's Club, as sustaining donors to AMSAT Project Funds, will be eligible to receive additional benefits. Application forms are available from the AMSAT Office.

Primary and secondary school students are eligible for membership at one-half the standard yearly rate. Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status. Contact Martha at the AMSAT Office for additional student membership information.

73,
This week's ANS Editor,
Joe Spier, K6WAO
k6wao at amsat dot org

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-73, k6wao
AMSAT Vice President Educational Relations
AMSAT News Service Co-Editor
ARISS-NA Education
2017 AMSAT Space Symposium Chairman